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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,066	07/10/2006	Huajie Chen	FIS920030342US1	5456
33074 7590 06/12/2008 INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 300-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533				
EXAMINER MEINZ, LAURA MARY				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/597,066

Applicant(s)

CHEN ET AL.

Examiner

Laura M. Menz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date 7/10/06
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8 and 11 recites the limitation "said second thickness" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. 4. The method in claim 1, wherein said thinning process comprises an HIPOX oxidation at temperature range of 550°C-700°C, pressure range of 1ATM-50ATM, **preferably** 5ATM- 20ATM. It is unclear which range Applicant intends to be limiting. It is noted that "high" pressure in its broadest sense must exceed 1ATM in order for it to be above standard atmospheric pressure.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Bedell et al ('249)

The applied reference has a common inventors/assignees with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Bedell teaches the following claimed limitations as cited below:

1. A method of forming a strained Si layer on a SiGe-on-insulator (SGOI) structure with a low stacking fault defect density, the method comprising the steps of:
providing a Si-on-insulator (SOI) substrate having an unstrained Si layer over an insulator (Col.4, lines: 35-40- preformed SOI);
depositing a first SiGe layer on said Si layer (Col.4, lines: 25-35);
thermally mixing said first SiGe layer with said Si layer to transform said first SiGe layer and said Si layer into a relaxed SiGe layer (Col.5, lines: 5-30);
thinning said relaxed SiGe layer (Col.7, lines: 35-45 and Col.8, lines: 10-20); and
depositing a strained Si layer on said relaxed SiGe layer (Col.6, lines: 60-65).

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2. The method in claim 1, wherein said process of thermally mixing said first SiGe layer with said Si layer comprises heating said first SiGe layer and said Si layer to approximately 1200°C-1300°C in an oxidizing environment (Col.5, lines: 30-40).

3. The method in claim 1, wherein said thinning process non-selectively thins said relaxed SiGe layer such that the Si and Ge within said relaxed SiGe layer are removed proportionately (Col.8, lines: 10-20- CMP will smooth and planarize the surface and therefore remove the material proportionately).

4. The method in claim 1, wherein said thinning process comprises an HIPOX oxidation (Col.8, lines: 10-20)- See also the 112 rejection made above).

6. The method in claim 1, wherein said thinning process comprises an in-situ HC1 etching process performed in an epitaxy chamber (Col.8, lines: 10-20).

7. The method in claim 1, wherein said thinning process comprises a CMP process (Col.8, lines: 10-20).

8. The method in claim 1, characterized in that a second thickness is less than 1000 Å (Col.7, lines: 30-35- Examiner's best attempt at interpretation of second thickness- see 112 rejection above.)

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9. The method in claim 1, characterized in that said SGOI is more than 60% relaxed (Col.10, lines:30-35).

10. The method in claim, characterized in that said SGOI has less than $1 \times 10^4/\text{cm}^2$ of stacking fault defects (Col.4, lines:60-65).

11. The method of claim 1, characterized in that a second thickness is less than 500 Å. (Col.10, lines: 50-55- Examiner's best attempt at interpretation of second thickness- see 112 rejection above.)

12. The method in claim 1, characterized in that said SGOI is more than 80% relaxed (Col.10, lines: 30-35).

13. The method in claim, characterized in that said SGOI has less than $1 \times 10^2/\text{cm}^2$ of stacking fault defects (Col.4, lines: 60-65).

14. The method in claim 1, wherein said thinning comprises an oxidation process and said method further comprises smoothing said relaxed SiGe layer to reduce surface roughness of said SiGe (Col.7, lines: 35-45 and Col.8, lines: 10-20);.

15. The method in claim 14, wherein said smoothing comprises one of:

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a touch-up CMP (Col.8, lines: 10-20- the post CMP etch is interpreted as a “touch up” since thinning already occurred through oxidation).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being obvious over Bedell ('249) in further view of Pastor ('260).

The applied reference has a common inventors/assignees with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome

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by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Bedell teaches the method of claim 1 and teaches thinning by low temperature steam oxidation; however fails to specify the temperature range as recited in claim 5 as follows:

5. The method in claim 1, wherein said thinning process comprises a steam oxidation at a temperature range of 550°C-700°C.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bedell's teachings to further include conducting the low temperature steam oxidation process at the temperature range of 550-700 because that is considered "low temperature" for steam oxidation methods as taught by Pastor (Col.2, lines: 50-60- teaching a low temperature steam oxidation process conducted at 700 degrees).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Menz whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Laura M Menz/
Primary Examiner, Art Unit 2813

06/05/08